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Kevin D. McCarthy

Typed Name: Kevin D. McCarthy
Date: January 24, 2007

Patent N2 Towers 0-02-141.01; 2641-95 MDP

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventors:	Richardson et al.
Title:	System and Method For Suppressing Fires
Serial No.:	10/672,169
Examiner:	Mr. Dinh Q Nguyen
Filed:	September 26, 2003
Art Unit:	3752

AMENDMENT AND RESPONSE

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Dear Sir:

This is in response to the outstanding Official Action dated July 24, 2006 issued in respect of the above-identified application.

The courtesy of the Examiner in granting an Interview on this application to the Applicant's representative, Mr. Matthew Powell, is much appreciated. It is believed that the Interview was material in advancing the prosecution of the application. The Interview Summary fairly summarizes the discussion at the Interview. The amendments (page 17), comments and submissions made herein complement and supplement those made to the Examiner at the Interview.

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Applicant encloses herewith a Petition for a Three-Month extension of time for response to the Official Action.

Claims 2, 5, 7, 11, 12, 13 and 15 have been amended to clarify the invention. More particularly, the reference in the claims to "first fire suppressing gas mixture" has been changed to "fire suppressing gas mixture". Furthermore, claim 2 has been amended to clarify that a percentage of the second gas is filtered from the fire suppressing gas mixture upon delivery into the space, rather than prior to delivery. The Examiner had felt that "prior to" read on the diesel fuel filtering prior to charging a compressed gas cylinder with gas as shown by U.S. Patent No. 6,202,755 to Hardge. Applicant does not consider the Hardge patent to be relevant to the invention claimed in the present application as was discussed during the interview and as will be set forth in detail below. However, this particular amendment was made to reduce the issues under consideration by clarifying that the fire suppressing gas mixture generated by the solid propellant chemical is filtered upon delivery into the space, as clearly distinct from Hardge's disclosure where there is no filtering at the time of the fire. Claim 12 has been amended in a similar manner to claim 2. Claims 11 and 15 have been amended to correct mere typographical errors.

In the Official Action, the Examiner rejected claims 2 to 5 and 7 under 35 U.S.C. 112 for being indefinite. It is believed that the amendments to claims 2, 5 and 7 to replace the reference to the "first fire suppressing gas mixture" with "fire suppressing gas mixture" overcomes the reasons for this rejection. Withdrawal of the rejection is therefore respectfully requested.

The Examiner has set forth three (3) rejections under 35 U.S.C. § 103(a) of all claims except claim 3 of the application in view of cited art. In the commentary set forth below, Applicant addresses each of these rejections in detail. In summary, however, it is important to the Applicant to set forth that the present application is directed to an apparatus and method that generates a fire suppressing gas mixture from a solid propellent and either filters the gas mixture or otherwise delivers only a fire suppressing gas mixture into a space. Various embodiments are claimed. Filtering of other agents such as solid particulates or otherwise delivering only a fire suppressing gas mixture into a space lends the claimed apparatuses and methods to "clean agent" applications, whereas in stark contrast the prior art requires delivery of chemically active

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powders (i.e., potassium iodide, baking soda, silicon etc.) which can be toxic, and without fail remains on objects in a space after the fire (i.e. not clean agent systems). Furthermore, in some claimed embodiments a percentage of water constituent is filtered from the fire suppressing gas mixture therefore reducing the chance that damaging dew would form on objects in the space during fire suppression. Furthermore, because the claimed apparatuses and methods are for use in normally occupied spaces, it is important and in some situations critical to remove particles from the fire suppressing gas mixture so that they do not cloud a person's vision when they are exiting the space. This advantage was demonstrated in the video shown to the Examiner during the interview, in which during testing of the fire suppression apparatus, the light through the window in the test chamber could always be seen (For reference, this video is available for viewing at http://www.n2towers.com).

The cited art to Holland et al., Hardge, Hock, Parkinson et al. and Canterberry et al. are all directed to aerosol systems (i.e. those systems that deliver solid particulates entrained in a gas) and therefore do not deliver only a fire suppressing gas mixture into the space. As can be imagined, delivery of, for example, baking soda in any chemically-acting significant quantities would immediately cloud the vision of a person attempting to exit a space, and furthermore would no doubt remain as a "dust" on objects in the space after fire suppression. Because of the residue, none of these systems could comply with standards set for "clean agent" systems, and because inherently a person's vision would be occluded due to entrained particles (i.e. baking soda, potassium iodide etc.), none of these systems could comply with standards set for normally occupied spaces.

Furthermore, the Hardge and Parkinson et al. references relate to compressed gas cylinder fire suppression technologies, and not to generating of fire suppressing gas from a solid propellant chemical. Still further, Hock is directed to airbags and not to delivery of a fire suppressing gas mixture into a space.

Further commentary, in respect of the particular rejections, is set forth below.

Claims 2, 4, 7, 11 to 13 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,024,889 (Holland et al.) in view of U.S. Patent No.

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6,202,755 (Hardge). Applicant respectfully requests reconsideration of this rejection in view of the following.

U.S. Patent No. 6,024,889 to Holland et al. discloses a chemically active fire suppression composition. A fire extinguishing apparatus 10 is shown in Figure 1 and includes a gas generator 12 and a passageway 14 attached to the bottom 22 of the gas generator 12. An electric initiator 18 is attached to the top of the gas generator 12 to ignite chemically active fire suppression composition 16 when a fire is detected. After ignition, chemically active and physically active fire suppressive gases are released into the fire when seal 20 attached to the bottom 22 of the gas generator 12 is broken due to the pressure inside the generator 12. The chemically active and physically active fire suppressive mixture comprises potassium species such as potassium iodide (symbol: KI; see Column 5, lines 17 to 62).

U.S. Patent No. 6,202,755 to Hardge discloses a fire extinguishing agent including an oxygen depleting agent, a heat removing endothermic agent, and a flame retarding agent. Hardge is an example of a compressed gas Halon fire extinguishing system. A five pound fire extinguisher tank 10 is shown in Figure 1, which holds a fire extinguishing agent under pressure preferably with nitrogen as the pressurant. As stated in Column 3, the agent comprises forty percent Halon gas mixture of equal parts Halon 1211 and Halon 1302, twenty percent carbon dioxide, and forty percent flame retarding agent. The flame retarding agent preferably includes a liquid flame retarding agent and baking soda. All of the components of the flame retarding agent are preferable in solution in water. During charging of tank 10, the Halon gases are provided into the tank 10 through a filter to remove chlorofluorocarbons which are found in the Halons.

Claim 2 as currently amended is as follows:

2. A method of suppressing fires in a space comprising the steps of:

(a) generating a fire suppressing gas mixture from at least one non-azide solid propellant chemical, the fire suppressing gas mixture comprising at least a first gas, said first gas comprising nitrogen; and

(b) delivering at least said first gas into the space; and

(c) filtering at least a percentage of a second gas from the fire suppressing gas mixture upon delivery into the space.

Because Holland et al.'s chemically and physically active fire suppressive mixture contains both gas and solid particulates, it is an aerosol (i.e. a mixture of gas with functionally substantial amounts of solid particulates) and not a gas mixture (a mixture of gases with no, or at least functionally insubstantial amounts of, solid particulates).

Hardge is also an aerosol system because it delivers baking soda entrained in gas. Furthermore, Hardge is an example of a compressed gas fire extinguishing system away from which the present application teaches due to the inherent physical space limitations of fire suppression systems that use compressed gas cylinders and a complex network of piping to deliver the suppressant to the spaces (see present application as filed paragraph [0004], for example). Furthermore, Hardge makes use of Halon 1301 for fire suppression, whereas the present application proposes and claims systems and methods that are designed to meet the standard set in 2001 by the National Fire Prevention Association for clean agent Halon 1301 alternatives (see present application as filed paragraph [0031], for example). By definition, a Halon 1301 system could not meet this standard. Still further, Hardge performs diesel fuel filtering prior to tank charging (i.e., when the Halon 1301 and 1211 are being forced into the tank 10), which cannot be said to be filtering of a gas upon delivery to a space. Also, while Hardge makes use of nitrogen as a pressurant which may in some insignificant volumes leak out of the compressed gas cylinder, his fire suppression agents are not said to contain nitrogen in any effective amount. For example, his oxygen depleting agent is preferably a Halon gas mixture, the heat removing agent is preferably carbon dioxide, and the flame retarding agent an aqueous solution of baking soda (Column 3, lines 3-14). Further along these lines, Hardge's heat removing agent being carbon dioxide teaches away from claim 4 of this application which recites filtering of carbon dioxide upon delivery into the space. It is partly this filtering of carbon dioxide that makes the present invention acceptable for use in normally occupied spaces, whereas the Hardge system is not.

As regards combining Holland et al. and Hardge, Applicant would like to point out that Holland et al. states that the provided composition "results in production of fire suppressive agents that do not have an adverse impact on the environment" (Column 5, lines 52-54). There would therefore be no motivation to combine the diesel fuel filter of Hardge with the system of

Holland et al. to provide an environmentally friendly fire suppression system, as the Examiner had suggested on page 3 of the Office Action. In particular, nothing would appear to be gained. In fact, even if there **were** some kind of motivation to combine these references provided in either (though Applicant submits there is not), as a practical matter provision of a diesel fuel filter with the Holland et al. system would be more likely to change the resultant fire suppression composition of Holland et al., possibly rendering it ineffective for fire suppression.

In view of the above, it can be seen that the combination of Holland et al. and Hardge is not appropriate and even if considered appropriate still results in deficiencies as regards claim 2 and its dependent claims 3 to 5 of this application and in particular the "filtering" step.

Claim 7 as amended is as follows:

7. A method of suppressing fires in a space comprising the steps of:

(a) generating a fire suppressing gas mixture from at least one non-azide solid propellant chemical, the fire suppressing gas mixture comprising at least a first gas, said first gas comprising nitrogen;

(b) delivering only the fire suppressing gas mixture into the space; and

(c) reducing the temperature of the fire suppressing gas mixture prior to delivering into the space.

It will be noted that claim 7 above recites delivering only the fire suppressing gas mixture into the space. Cited art to Holland et al. and Hardge do not deliver only a fire suppressing gas mixture. Rather, the cited art delivers an aerosol as has been set forth in detail above. As such, while there is no express "filtering" step as recited in claim 2 above, the express recitation of "delivering only the fire suppressing gas mixture into the space" is not disclosed by Holland et al.'s or Hardge's delivery of an aerosol with potassium iodide particulates or baking soda particulates into a space. Furthermore, as set forth above, Hardge is directed to a compressed gas system employing Halon gases, which does not relate to the present application's teachings and claims of generating a fire suppressing gas mixture from at least one non-azide solid propellant chemical.

In view of the above, it can be seen that the combination of Holland et al. and Hardge is not appropriate and even if considered appropriate still results in deficiencies as regards claim 7

of this application and in particular the "delivering only the fire suppressing gas mixture into the space" step.

Claim 11 as currently amended is as follows:

11. An apparatus for suppressing fires in a normally occupied enclosed space comprising:

(a) a sensor for detecting a fire;

(b) at least one solid inert gas generator that, in response to receiving a signal from the sensor, ignites to generate only a fire suppressing gas mixture for delivery into the enclosed space; and

(c) an inert gas discharge diffuser to direct the fire suppressing gas mixture into said enclosed space

wherein the fire suppressing gas mixture includes nitrogen; and

wherein the fire suppressing gas mixture includes at least one of water vapor and carbon dioxide.

As has been stated above, both Holland et al. and Hardge deliver aerosols with solid particulates to the space, and therefore do not deliver "only the fire suppressing gas mixture into said enclosed space" as also recited in claim 11. It will be noted that both Holland et al. and Hardge are directed to provision of chemically-active fire suppressants into a space (i.e. potassium iodide or baking soda etc.) and therefore are not directed to generation and delivery into a space of fire suppressing gas mixture from a solid <u>inert</u> gas generator, as recited in claim 11. Furthermore, neither Holland et al. nor Hardge disclose "a sensor for detecting a fire". In fact, the disclosures of Holland and Hardge appear to describe only manually-operated devices and therefore do not teach or suggest such a sensor. The only related disclosure is in Holland et al. at Column 6, lines 35 to 37, which states "An electric initiator 18 is attached to the top of the gas generator 12 to ignite the chemically active fire suppression composition <u>when a fire is detected</u>. (emphasis added)", but this cannot be said to clearly disclose the use of an actual sensor.

Furthermore, neither opening 46 of Holland et al.'s device in his Figure 2 nor Hardge's "nozzled outlet 12" of Figure 1 are diffusers. Both features in the cited art are merely openings –

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the Hardge outlet is for pointing by a user, as can be seen by the portable compressed gas canister configuration shown in Figure 1. One of the advantages of the present invention is that the apparatus can be sized sufficiently to add a large number of units to suppress fires in a very large space. Multiple units spaced throughout the compartment may be warranted to provide better mixing and inert gas coverage in the space. Various diffusers are shown in Figures 2a to 2d which act to direct and spread out the fire suppressing gas mixture. Such diffusers are not shown in Holland et al. or Hardge because Holland et al. is completely silent on how a fire suppressing mixture is provided to a fire and the opening of Hardge's device is clearly meant to be pointed directly at the fire by a person. In contrast, a diffuser acts to overcome the requirement that the fire suppression apparatus be pointed by a person into a space. The diffuser directs the fire suppressing gas mixture, permitting the apparatus to overcome limitations of a room for example when placed in a corner such that it does not have to rely on the particular geometry of a corner of the room to direct the fire suppressing gas mixture to the fire. The diffuser acts to perform this action. Therefore, neither Holland et al. nor Hardge disclose "an inert gas discharge diffuser to direct the fire suppressing gas mixture into said enclosed space", as recited in claim 11.

In view of the above, it can be seen that the combination of Holland et al. and Hardge is not appropriate and even if considered appropriate still results in deficiencies as regards claim 11 of this application and in particular the "sensor for detecting a fire" and "at least one solid <u>inert</u> gas generator that, in response to receiving a signal from the sensor, ignites to generate only a fire suppressing gas mixture for delivery into the enclosed space (emphasis added)", and "diffuser" features.

Claim 12 as currently amended is as follows:

12. An apparatus for suppressing fires in a normally occupied enclosed space comprising:

(a) a sensor for detecting a fire;

(b) at least one solid inert gas generator that, in response to receiving a signal from the sensor, ignites to generate only a fire suppressing gas mixture for delivery into the enclosed space; and

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(c) an inert gas discharge diffuser to direct the fire suppressing gas mixture into said enclosed space;

wherein the fire suppressing gas mixture comprises at lease two gases and the apparatus further comprises at least one filter for filtering at least a portion of at least one of the gases from the fire suppression gas mixture, upon the delivery thereof to the enclosed space.

As has been stated above, both Holland et al. and Hardge deliver aerosols with solid particulates to the space, and therefore do not deliver "only the fire suppressing gas mixture into said enclosed space" as claimed. It will be noted that both Holland et al. and Hardge are directed to provision of chemically-active fire suppressants into a space (i.e. potassium iodide or baking soda etc.) and therefore are not directed to generation and delivery into a space of fire suppressing gas mixture from a solid inert gas generator, as recited in claim 12. Furthermore, as has been stated, neither Holland et al. nor Hardge disclose "a sensor for detecting a fire".

In view of the above, it can be seen that the combination of Holland et al. and Hardge is not appropriate and even if it were considered appropriate still results in deficiencies as regards claim 12 of this application and in particular the "sensor for detecting a fire" and "at least one solid inert gas generator that, in response to receiving a signal from the sensor, ignites to generate only a fire suppressing gas mixture for delivery into the enclosed space" features. Furthermore, as has been stated above, the combination of Holland et al. and Hardge do not render obvious the "at least one filter for filtering at least a portion of at least one of the gases from the fire suppression gas mixture, upon the delivery thereof to the enclosed space" feature.

Claim 13 incorporates by reference the features of claim 12 and is therefore believed to distinguish over Holland et al. and Hardge for at least that reason.

Claim 15 as amended is as follows:

15. A gas generator for generating and delivering a fire suppressing gas mixture to an enclosed space, comprising:

a housing;

at least one pre-packed solid propellant disposed within said housing;

a pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture; and

a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space;

at least one filter for filtering at least a portion of one gas from said fire suppressing gas mixture.

It will be noted that claim 15 above recites generating and diffusing only said fire suppressing gas mixture. Cited art to Holland et al. and Hardge do not generate and diffuse only a fire suppressing gas mixture. Rather, the cited art delivers an aerosol as has been set forth in detail above. Furthermore, as set forth above, Hardge is directed to a compressed gas system employing Halon gases, which does not relate to the present application teachings and claims of generating a fire suppressing gas mixture from at least one non-azide solid propellant chemical. Still further, as has been stated above, the combination of Holland et al. and Hardge do not render obvious the "at least one filter for filtering at least a portion of at least one of the gases from the fire suppression gas mixture" feature.

Furthermore, as has been reasoned above with reference to claim 11, neither Holland et al. nor Hardge disclose "a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space".

In view of the above, it can be seen that the combination of Holland et al. and Hardge is not appropriate and even if considered appropriate still results in deficiencies as regards claim 15 of this application and in particular at least the "discharge diffuser" and "at least one filter" features.

In view of the above, it is respectfully requested that the rejection of claim 2, 4, 5, 7, 11 to 13 and 15 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,024,889 (Holland et al.) in view of U.S. Patent No. 6,202,755 (Hardge) be withdrawn.

Claims 17, 18 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,992,528 (Parkinson et al.) in view of U.S. Patent No. 6,019,861 (Canterberry et al). Applicant respectfully requests reconsideration of this rejection in view of the following.

U.S. Patent no. 5,992,528 to Parkinson et al. discloses an inflator based fire suppression system. As can be seen in Figure 1 and the Abstract, this cited art is directed to system that uses a compressed gas for fire suppression and therefore teaches away from the present application, which is directed to generation of gas from solid propellants. Parkinson et al. does disclose the retention of a gas-producing combustible material 131 housed in a combustion chamber 129 (Column 4, lines 26 to 30). The combustion chamber 129 contains a projectile 162 which, upon combustion of the combustible material 131 is pressure-forced through a burst disk 152 into chamber 156 to provide a flow path for stored compressed gas and powdered fire extinguishing material.

U.S. Patent No. 6,019,861 to Canterberry et al. is directed to compositions for inflating occupant safety restraints. The composition includes non-azide fuel, phase stabilized ammonium nitrate (PSAN) and silicon with a particle size of from about 2 to 100 microns (See Abstract and Column 6, lines 39-41), or iron oxide.

Claim 17 is as follows:

17. (Previously Presented) A gas generator for generating and delivering a fire suppressing gas to an enclosed space, comprising:

a housing;

at least one pre-packed solid propellant disposed within said housing;

a pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture; and

a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space;

wherein said discharge diffuser includes a 180° directional cap.

It is respectfully submitted that both Parkinson et al. and Canterberry et al. are directed to "aerosol" systems and therefore do not generate only a fire suppressing gas mixture, as recited in claim 17. The cited art also fails to disclose "wherein said discharge diffuser includes a 180° directional cap" as recited in claim 17 which, as stated above, provides advantages for directing a gas mixture into a space in a particular way. Furthermore, Parkinson et al. fails to disclose the generation of a fire suppressing gas mixture from a solid propellant because Parkinson et al.

merely ignites a combustible material for the purpose of propelling a projectile through a burst disk for providing a flow path for the compressed aerosol. The gas generated by Parkinson et al.'s combustible material is not stated by Parkinson et al. to be material in the suppression of a fire, is not specified in composition, and therefore cannot automatically be said to be a fire suppressing gas mixture as recited in claim 17. Furthermore, provision of Canterberry et al.'s compositions into Parkinson et al.'s device to act as the combustible material for propelling the projectile would still fail to provide any meaningful volume of a fire suppressing gas mixture. It would therefore be unlikely that the skilled artisan would combine the two references to arrive at that which is recited in claim 17.

In view of the above, it can be seen that the combination of Parkinson et al. and Canterberry et al. is not appropriate and even if considered appropriate still results in deficiencies as regards claim 17 of this application and in particular the "discharge diffuser" and generation of only a fire suppressing gas mixture features.

Claim 18 is as follows:

18. A gas generator for generating and delivering a fire suppressing gas mixture to an enclosed space, comprising:

a housing;

at least one pre-packed solid propellant disposed within said housing;

a pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture; and

a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space;

wherein said discharge diffuser includes a 360° directional cap.

It is respectfully submitted that both Parkinson et al. and Canterberry et al. are directed to "aerosol" systems and therefore do not generate only a fire suppressing gas mixture, as recited in claim 18. The cited art also fails to disclose "wherein said discharge diffuser includes a 360° directional cap" as recited in claim 18 which, as stated above, provides advantages for directing a gas mixture into a space in a particular way. It will be noted that Parkinson et al.'s diffuser 146 does not provide continuous diffusion over 360° but rather spaced apart diffusion, the purpose of

which is not clear. Furthermore, as stated above Parkinson et al. fails to disclose the generation of a fire suppressing gas mixture from a solid propellant because Parkinson et al. merely ignites a combustible material for the purpose of propelling a projectile through a burst disk for providing a flow path for the compressed aerosol. The gas generated by Parkinson et al.'s combustible material is not stated by Parkinson et al. to be material in the suppression of a fire, is not specified in composition, and therefore cannot automatically be said to be a fire suppressing gas mixture as recited in claim 18. Furthermore, provision of Canterberry et al.'s compositions into Parkinson et al.'s device to act as the combustible material for propelling the projectile would still fail to provide any meaningful volume of a fire suppressing gas mixture. It would therefore be unlikely that the skilled artisan would be likely to combine the two references to arrive at that which is recited in claim 18.

Claim 20 is as follows:

20. A gas generator for generating and delivering a fire suppressing gas mixture to an enclosed space, comprising:

a housing;

at least one pre-packed solid propellant disposed within said housing;

a pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture; and

a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space;

wherein said discharge diffuser includes a 90° directional cap.

Commentary similar to that given above for claims 17 and 18 apply to claim 20 also. More particularly, Parkinson et al. and Canterberry et al. do not properly combine to provide the generation of only a fire suppressing gas mixture, nor do they combine to provide a discharge diffuser that includes a 90° directional cap.

In view of the above, it is respectfully requested that the rejection of claims 17, 18 and 20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,992,528 (Parkinson et al.) in view of U.S. Patent No. 6,019,861 (Canterberry et al.) be withdrawn.

Claims 16 to 19 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,024,889 (Holland et al.) in view of U.S. Patent No. 6,202,755 (Hardge) and further in view of U.S. Patent No. 5,876,062 (Hock). Applicant respectfully requests reconsideration of this rejection in view of the following.

U.S. Patent no. 5,876,062 to Hock discloses an airbag inflator system which houses in a first inner chamber thereof solid fuel gas generant bodies and an electrical ignitor. The gas generant bodies are small solid bodies packed closely together, and the ignitor comprises a wire or filament submersed in the gas generant and connected to a vehicle crash sensor circuit. A second chamber surrounds the first chamber and houses a filter for filtering and cooling the gas generated upon ignition before exiting through diffuser exit ports into the associated airbag.

Claim 16 is as follows:

16. A gas generator for generating and delivering a fire suppressing gas mixture to an enclosed space, comprising:

a housing;

at least one pre-packed solid propellant disposed within said housing;

a pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture; and

a discharge diffuser for directing the fire suppressing gas mixture within said enclosed space

at least one screen for reducing the temperature of said fire suppressing gas mixture.

As has been stated above, both Holland et al. and Hardge are directed to aerosol systems, whereas claim 16 clearly recites generating only the fire suppressing gas mixture. Furthermore, there is no motivation to combine any of these references. This has been reasoned above as regards the Holland et al. and Hardge references, and is further because Hock is directed to an automotive air-bag inflator and is unrelated to fire suppression. Hock's system is incapable of effectively providing a fire suppressing gas mixture into a room, but rather only relates to filling an airbag with gas. Hock's device is complex and is triggered by a vehicle's on-board crash sensor circuit, not by a fire. Hock's "diffuser 14" is for directing flow into a small airbag

enclosure, and its design is inappropriate for diffusion of a fire suppressing gas mixture into a room or other space to suppress a fire. Furthermore, the required volumes of gas for inflating an airbag would be much different than those required for suppressing a fire.

Despite Holland referring to automotive airbags in his background, it is with reference only to "Solid propellant formulations similar to those used in rocket engines and automotive airbags". Therefore Holland does not provide a clear directive to employ airbag inflating systems and related methods in order to provide functional fire suppression.

Furthermore, it is unlikely that one having ordinary skill in the art would be motivated to combine Holland, Hardge and Hock, because Hock's outer toroidal chamber 30, referred to as a filter chamber, removes "entrained particulate residues prior to venting into the airbag cushion" (Abstract). Therefore, even if Hock's filter system were to be applied to the Holland et al. or Hardge et al. systems, the potassium iodide particulates required by Holland et al. or the baking soda required by Hardge to effectively suppress a fire would never be delivered into the space in order to be active as a chemical suppression agent. In this case, the Holland et al. or Hardge composition would be undesirably altered, and not sufficient for fire suppression. Given that Hock does not provide a fire suppression system, it follows that a combination of these references, even if inappropriate, would still result in a system that could not suppress a fire in a space.

As regards claim 18, the above commentary regarding the inappropriate combining of Holland et al. Hardge and Hock apply also. More particularly, the combination of references do not disclose the "pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture" and "discharge diffuser for directing the fire suppressing gas mixture within said enclosed space; wherein said discharge diffuser includes a 360° directional cap" features.

As regards claim 20, the above commentary regarding the inappropriate combining of Holland et al. Hardge and Hock apply also. More particularly, the combination of references do not disclose the "pyrotechnic device for initiating ignition of said solid propellant to thereby generate only said fire suppressing gas mixture" and "discharge diffuser for directing the fire

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suppressing gas mixture within said enclosed space; wherein said discharge diffuser includes a 90° directional cap" features.

In view of the above, it is respectfully requested that the rejection of claims 16 to 19 and 20 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,024,889 (Holland et al.) in view of U.S. Patent No. 6,202,755 (Hardge) and further in view of U.S. Patent No. 5,876,062 (Hock) be withdrawn.

It is respectfully submitted that this application is now in order for allowance, and action to that end is respectfully solicited.

Respectfully submitted,

Dated: January 24, 2005 By: Kevin D. McCarthy

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